Administering MySQL Databases

Session 648

These are confidential sessions—please refrain from filming or taking pictures.

Enterprise IT

Administering MySQL Databases

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http://developer.apple.com/wwdc2005/

Introduction

- MySQL—tools you can use to administer MySQL
- Real world deployment—the LiveWorld case study
  - Hardware and software selection
  - Replication
  - Failover
  - Fault tolerance
  - Monitoring

MySQL AB

JD Duncan
Consulting Engineer

http://developer.apple.com/wwdc2005/

Administering MySQL Databases

- Administration tools
- Monitoring tools

MySQL Command-line Tools

- `mysql` interactive queries
- `mysqladmin` administrative tasks
  - Start and stop server
  - GRANTs and passwords
  - Start and stop replication slave
- `mysqldump` export & backup
- `mysqlbinlog` point-in-time recovery

MySQL Administrator

- Basic administration tool
- Dynamically monitoring database health
- Administer servers
- Backup and restore databases
- Administer Users
  - Adding users
  - Assigning passwords
  - Define user profile information
- Quickly optimize MySQL database

MySQL Query Browser

- Query toolbar
  - Execute SQL statements
  - Review results
- Transactions buttons
  - Start
  - Commit
  - Rollback
- Object browser
- Information browser

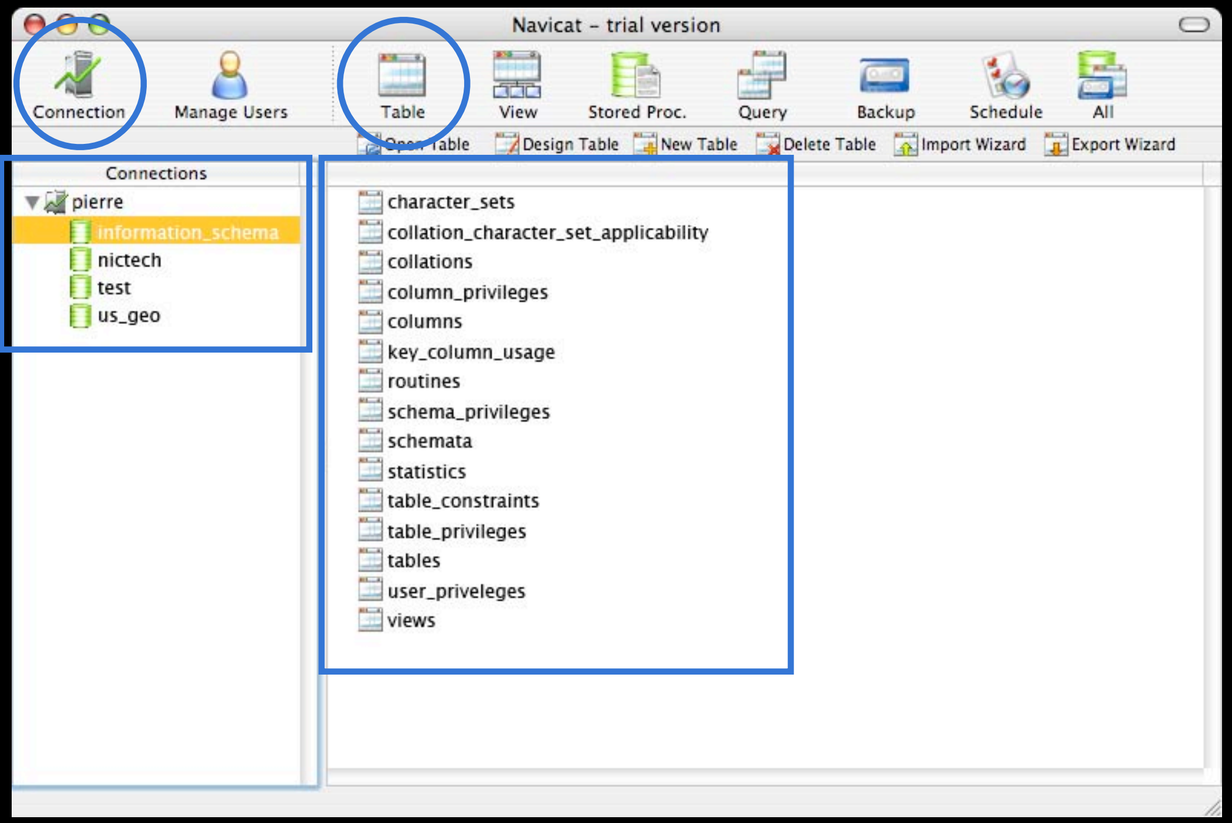
Demo

MySQL Monitor, MySQL Administrator, MySQL Query Browser

http://developer.apple.com/wwdc2005/

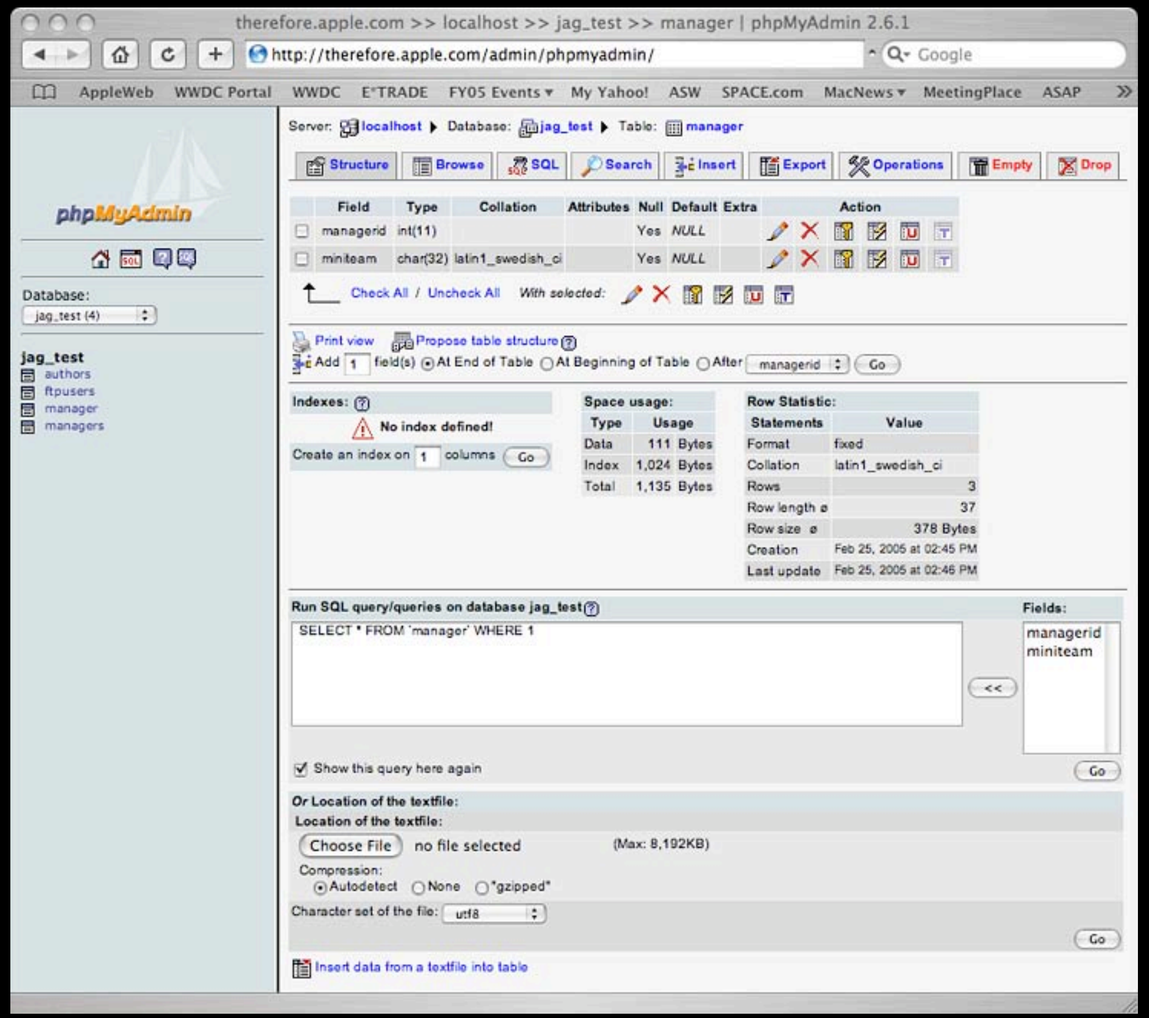
Navicat

www.navicat.com



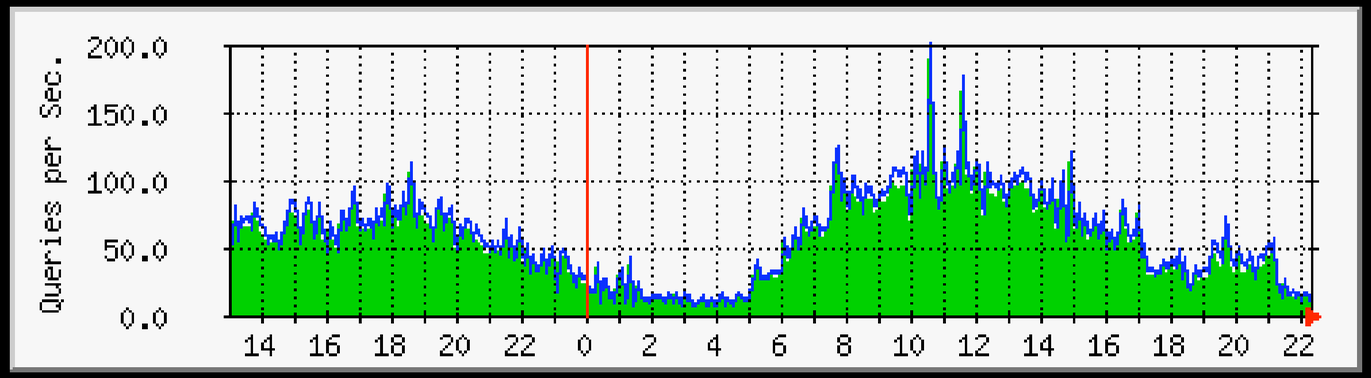
PhpMyAdmin

www.phpmyadmin.net



MRTG and RRD-based Tools

rrdtool.org



Selects-total queries

Other Open Source Projects

- Nagios
  - www.nagios.org
- Google mMAIM
  - MySQL Monitoring and Investigation Module
  - http://code.google.com/
  - Google internal project

MySQL Developer Zone

http://dev.mysql.com/

- Forums
- Mailing Lists
- Bug database
- Documentation

MySQL Services

- MySQL network
  - http://www.mysql.com/network
  - knowledge base
  - 24x7 support
- MySQL consulting
  - http://www.mysql.com/consulting
  - Architecture and design
  - Performance tuning and optimization
  - Migration

LiveWorld

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Using MySQL at LiveWorld

- Why LiveWorld
- Our database servers
- MySQL versions
- Deploying MySQL
  - Tuning
  - Production vs Admin
  - Replication
  - Failover
  - Fault tolerance
  - Monitoring

Why LiveWorld

- Leading provider of collaborative/community solutions since 1996
- Online community experience before online existed
- Profitable, public company
- Works closely with MySQL on technology needs
- High volume, high redundancy configuration
- High profile, high volume client base

LiveWorld: Working With Market Leaders

THE WALL STREET JOURNAL. ONLINE
America Online
palm
hp
abc
TOYOTA
Sun microsystems
HBO
ebay
SONY BMG MUSIC ENTERTAINMENT
MATTEL
Merrill Lynch
Cisco Systems
Shell
BMW
Kodak
bea
food NETWORK
Coca-Cola
MINI
intel
Discovery CHANNEL
SlimFast
Intuit
GM
citi
NBC
Expedia.com
H&R BLOCK

dev2dev Online

eBay Clubs - Groups

http://groups.ebay.de/index.jspa

易趣论坛: 28周准妈咪跪乞回复，我的宝宝能留下吗？ ...

eBay - apple cinema display, Apple Macintosh Computers, Monitors Projectors, Boys items at low prices

QVC Forums Community: Open Forum

http://community.qvc.com/category.jspa?categoryID=1003

A&E Television Network

campaignforrealbeauty forums Greece

Hotel Vitale-a Luxury Joie de Vivre Hotel - San Francisco Hotels - CA

http://www.expedia.com/pub/agent.dll?qscr=dspv&&itid=&itdx=

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Email this hotel to a friend

Hotel Vitale-a Luxury Joie de Vivre Hotel

☆☆☆☆ Hotel class

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All reviews displayed below were written by customers who stayed at this hotel.

Traveler ratings summary

Overall satisfaction	100% of travelers recommend this hotel			
	Hotel service	Hotel condition	Room cleanliness	Room comfort
5.0	5.0	5.0	5.0	5.0

Scores are based on a 1 (poor) to 5 (excellent) rating system.

Write a review of this hotel (You may be required to sign in to verify your stay)

Individual ratings and reviews

A traveler from Tucson,/New York City **recommends this hotel**

Overall satisfaction	Hotel service	Hotel condition	Room cleanliness	Room comfort
5	5	5	5	5

Posted: 21-Mar-05

If you're into the finer things...
Then you'll love this place. We visited a few days after the grand opening so the business center and fitness studio were not yet up and running. The decor is luxurious and relaxing, bath products, linens and the bath robes,OOOH! You may not want to leave the hotel but if you do, you can't beat the location, location, location.

Traveler's tip on local attractions
On your first day, do a trolley hop tour and you will really appreciate the hotel location.

Write a review of this hotel (You may be required to sign in to verify your stay)

Just the Facts, Ma’am

(May 2005)

- 18 discussion board clients
- 91 discussion boards
- 30 countries
- 20 languages
- 84.3M dynamic page views

Just the Facts, Ma'am

(May 2005)

- 4 and a bit MySQL servers
- 1401 queries per second average
- 91 databases
- 124 daily backups
- 1488 server snapshots

Database Hardware Platform

LiveWorld Database Architecture

HW Load Balancers

Production servers talk
to database pairs

MySQL Servers

Replication keeps data
synchronized between
both servers in pair

mysqld_multi to enable better use of server
memory (2 - 3 instances of mysqld per server)

MySQL Admin

One way "delayed"
replication to MySQL Admin

- Nightly backups
- 2 hourly snapshots
- Stats and client reports
- Watches (digests)

Which Binary should I use?

- Apple Build
  - Out of the box with OS X
  - It just works
  - Not always the latest version
- MySQL Build
  - Latest release version
  - Easy to install
  - Don’t forget Apple’s binary is still there
- Do it yourself
  - Special needs
  - Knowledge of compiling and building

Tune your database

- Memory
  - Total memory
  - Individual caches
- Database engine
  - Use InnoDB, unless…
- Index your databases
  - Slow Query Log
  - MySQL's "explain" command

Production vs Administration

- Production machines = Fast
- Administration Tasks = Slow
- Administration impact on production servers = :-(
- Separate Admin tasks from production servers
- mysql-admin
  - Many instances of mysqld
    - Each instance slaves on production pair
  - Reports, backups, watch processing etc…
  - Full logs here, less in production

Log Management Script

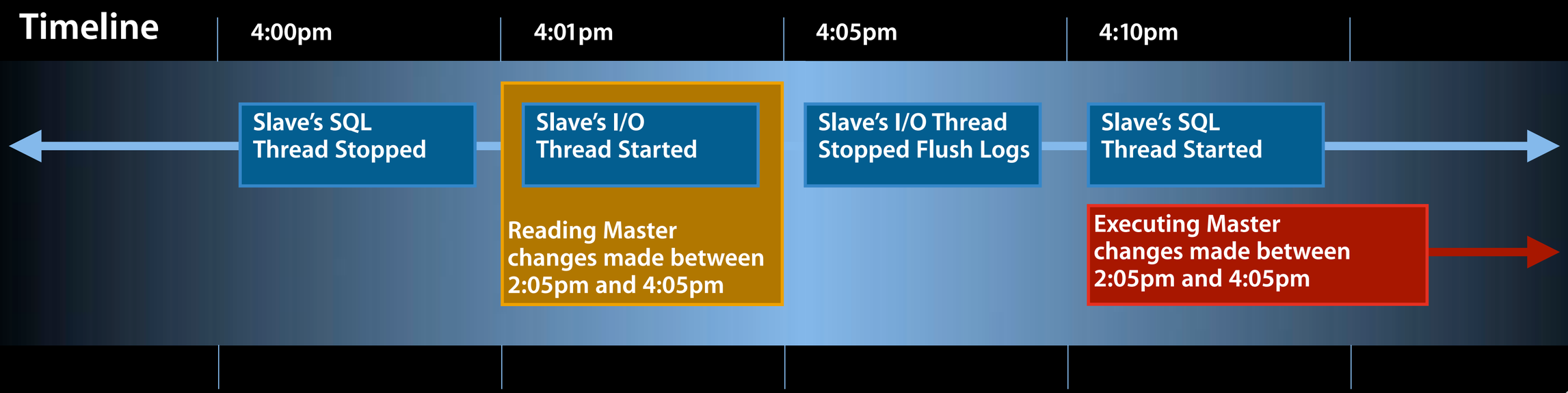
Logs and stats are space consuming

- Reduce size of logs on production machines
- Without reducing the logs on admin server

```
#!/bin/sh

# Get the date in Seconds and subtract 7 days, turn it into milliseconds

seconds=`date +%s`
seconds=$(($seconds-604800))
seconds=$(($seconds*1000))

# Loop for each database... connect, turn off binlog, delete logs older than 30 days

for DB in `mysql --exec="SHOW DATABASES LIKE 'boards%';" --column-names=FALSE`
do

mysql --exec="SET SQL_LOG_BIN=0; DELETE FROM stats WHERE timestamp < $seconds;" $DB

done
```

Replication

- Active Replication
  - Fast, reliable synchronization
- Delayed Replication
  - 2 Replication threads—read and execute
  - cron controls when slave reads and when slave executes



Failover

Or who to call when the database server isn't

- Hardware load balancers
  - Monitors server presence and fails out dead servers
- Server pairing
  - One application server speaks to one database server
- Driver based solutions
  - MySQL Connector/J (JDBC driver)

Fault Tolerance

- Transactional queries
- Replication
- Failover
- Backup
- Logging

Monitoring

Know everything that is going on, all the time

- Monitoring and alerting system
- Build your own tests
  - Server up
  - Active thread count
  - Replication status
  - Database retrieving actual data

Thread Count Script

- Know how many threads are active normally
  - Test to see how many threads are active now
  - Set response keyword based on thread count
- Tie test to TCP/IP (xinetd)
  - Monitor TCP port for keyword

```
#!/bin/sh

value=`/usr/local/mysql/bin/mysql -e "show status like 'Threads_running';"| awk '/Thread/ {print $2};'`

valueper=`expr $value`
threadcount="Good Thread Usage - $valueper threads"

if [ "$value" -gt 20 ]
then
threadcount="High thread usage - $valueper threads"
fi

echo $threadcount
```

Monitoring

Use the information you collect

- Trigger an alert
  - Email
  - Pagers
  - Flashing lights
- Take appropriate action
  - Restart a server
  - Run a script
  - Do nothing

Things That Make a Difference

- Make hardware choices that make sense for your needs
- Tune your database
- Separate admin and production tasks
- Monitor: test, alert, respond
- Automate

More Information

http://developer.apple.com/wwdc2005/

Documentation, Sample Code, and Other Resources

http://developer.apple.com/wwdc2005/

Q&A

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